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RESEARCH , DEVELOPMENT AND
TESTING NATIONAL
INSTITUTE FOR ELECTRICAL ENGINEERING

LIT

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TEST REPORT
No.40726 / 24.05.2006

1. **Product: Early Streamer Emission Lightning Conductor–ESELC type FOREND EU-M N/1**
2. **Test:** Evaluation of the initiation advance according to NF C 17 – 102 / 1995 standard
3. **Test order:** Contract no.3871 / 20.05.2005
4. **Customer:** FOREND ELEKTRIK MALZEMELERI ve DIŞ TICARET ANONIM ŞIRKETI
5. **Customer's address:** 19 Mayis Mh. Buyukdere Cd. Basman Han No:4 Kat: 4 Sisli / Istanbul TURKEY
6. **Test result:** There are presented the measurements results
7. **Test responsible:** Eng. I.Badea

Test Supervisor
Eng. A. Ungureanu

Q.A. Responsible:
Eng. Gh. Macovei

APPROVED
LABORATORY HEAD
Eng. Dorin Popa

8. **The test report contains 12 pages.**
9. **The test report was edited in 4 ex.; 1 ex to LIT and 3 ex to customer.**

CAUTION:

a. The test result makes reference only to tested product .
b. Integral reproduction of the test report is forbidden.
c. Any part of this test report may be reproduced only with the accord of LIT.
d. Reports without original signatures are not valid.

1. Tested material

Early Streamer Emission Lightning Conductor (ESELC) type **FOREND EU-M N/1**
See photo on pages 9, 10
Lightning Conductor supplied by FOREND ELEKTRIK MALZEMELERI ve DIŞ TIGARET ANONIM ŞIRKETI – TURKEY

2. Type of tests

A switching impulse wave negative polarity and a DC voltage of negative polarity are applied on the upper metallic plane.

3. Specification

N F C 17 – 102 / 1995 Appendix C

4. Test equipment

Laboratory inner dimensions: 48 m x 32 m x 27 m (height)
Altitude: 100 m above see level
4200 kV High Voltage Impulse Generator type SPF 340; 340 kWs, TUR Dresden - Germany
1000 kV Rectifier cascade type GS 1000 / 30; 30 mA; TUR Dresden – Germany
1400 kV Damped capacitive divider, ICMET Craiova, Romania;
TR – AS transient – recorder, Dr.Strauss System Electronik, GmbH- Germany
Impulse calibrator type KAL – 1000, 0.84 / 60 µs and 20 / 3000 µs Dr.Strauss System Electronik, GmbH – Germany
Fluke calibrator type 5500 A.

5. Test circuit

See the test circuit diagram on page 11
The 1400 kV damped capacitive divider was calibrated by official Accredited Laboratory DKD – K – 18702, Romania with certificate 0060 of 14th January 2004 and checked before beginning of measurement with the impulse calibrator KAL 1000, calibrated by PTB – Braunschweig – Germany, calibration certificate 3080 PTB 05, and Fluke 5500 A calibrator calibrated by Metrology National Institute of Romania, calibration certificate 000256/DKD – K – 39701/06.05.

9. TEST ON **ESELC** TYPE **FOREND EU-M N/1**

9.1. Atmospheric conditions

BEFORE TEST	Beginning of the test: 13h09 p = 1004 mb t = 22 °C hr = 66 %
AFTER TEST	End of the test: 15h20 p= 1003 mb t = 22.5 °C hr = 63 %

9.2. Results

See tables on page 7

Number of significant impulses: 100

Average of significant T_B:

- calculated from the experimental wave T'_{PDA}= 248.39 µs Stdev: 33.8 %
- transferred on the reference waveform: T_{PDA} = 308.86 µs

See curves on page 8

Triggering advance: $\Delta T = T_{PTS} - T_{PDA} = 358.80 - 308.86 = 49.94$ µs